Student Fee Review Board
Funding Application for Fiscal Year
2021-2022

Center for the Advancement of Spatial Informatics Research and Education
Name of Unit

Christopher Lippitt — Director
Dean/Director — Title

UNM Interdisciplinary Sciences: ATTN ASPIRE, 210 Yale Blvd NE, PAIS room 2140, Albuquerque NM 87106
Campus Address

505 277 -2811 — rowanconverse@unm.edu
Campus Phone — E-mail Address

$ 212,676 — clippitt@unm.edu
Total Amount Requested — Alternate Email Address

One-Time Funding ☑ **Recurring** ☑ **Requesting Increase** ☐

CERTIFICATION

I certify that the statements herein are true and complete to the best of my knowledge and accept the obligation to comply with the terms and conditions of the Student Fee Review Board. I understand that the SFRB is a **recommendation** body and that its funding allocations are subject to revision by the Budget Leadership Team before final approval.

Rowan Converse
Submitted By (Print Name)

Christopher Lippitt — Sept. 10 2020
Department Head Signature — Date

Please submit an electronic version of this application via email to SFRB@unm.edu.

DEADLINE September 11, 2020, 5:00 PM.

***Late applications will not be accepted**

DEPARTMENT OF
GEOGRAPHY &
ENVIRONMENTAL STUDIES

Application Questions

1. Describe the history and mission of your unit, and how its services support the mission of the University. Please address each of the following bullet points in your answer.
a. What services does your unit specialize in that are not offered in a similar form elsewhere within the University?
b. How does your unit serve the University's commitment to diversity?

The Center for the Advancement of Spatial Informatics Research and Education (ASPIRE) was established in fall 2019, with the completion of the new Physics, Astronomy, and Interdisciplinary Sciences building. It forms one of six interdisciplinary research centers within the new Interdisciplinary Sciences Co-op. With geospatial skills now in high demand from employers around the world and in numerous research and market sectors, our mission is to foster integrative Geographic Information Science (GIScience) research and education and application of cutting-edge geographic information technologies (GIT) at the University of New Mexico through cooperative research and education, development of novel GITs, and expert data collection and analysis services that are available nowhere else on campus.

We uphold UNM's commitment to fostering diversity, equity, and inclusivity in our hiring as well as through our research programs, which address pressing concerns for communities in New Mexico and throughout the southwest

2. Briefly describe each program/project in your unit that is funded specifically by student fees. What are the outcomes, so far, of each program/project? What, if any, changes do you plan to make to these programs/projects?

We do not currently have any programs or projects funded specifically by student fees.

3. Does your unit have an SFRB balance forward? If so, please justify this balance forward and describe how you will utilize it.

Our unit does not have an SFRB balance forward.

4. Describe any increase in SFRB funding you are requesting, and provide justification detailing how raising student fees will improve your unit's impact on the student population. If requesting increases for multiple programs/projects, which program/project is your top priority? If requesting an increase, please state any reserves in your unit's budget and provide justification for not using said reserves for the requested increase.

ASPIRE's mission is to **promote geospatial research methodologies and pedagogy** at UNM and to the general public, which is critical in helping our university and communities prepare for the "Digital Earth" Century. Expanding ASPIRE's technological and human capacity will enable us to offer more education, training, and support resources to student researchers across campus. This includes both one-time requests for funding for equipment as well as ongoing support for staff and graduate student assistants.

The one-time request for equipment will allow ASPIRE to provide student researchers with greater access to geospatial technologies. This expansion will require the following operational items: desktop computers, GNSS survey equipment, GPS-enabled tablets to enable development of geospatial applications, and GPS enabled cameras to support both quantitative and qualitative

field work (Table 1). We will develop equipment check out protocols to ensure that we can effectively offer **free access to geospatial field equipment for the broader UNM student** community.

ASPIRE currently provides 4 desktop computers with specialized GIS and photogrammetry software to be used in classes, training workshops, and independent student research. ASPIRE has also provided access per request to students who required geospatial software during the pandemic. With a one-time request for four more computing workstations as well as a recurring request for funding to transition our current lab manager to full-time, we will be able to offer more lab hours to the broader UNM community and accommodate additional student researchers.

Table 1. One-time and Recurring Funding for the SPL and UAS Training Lab

Project	One-Time Funding	Recurring Funding	Existing Infrastructure
ASPIRE lab space and Visualization Lab Expansion	• Add 4 image processing workstations • Image processing software • Tablets • GNSS survey equipment	• 1 Lab manager FTE, funded as staff	• 4 image processing workstations w/geospatial Software • 1 Lab manager .75 FTE, funded as GA
UAS Training Lab Establishment	• Quadcopters • Tethered helium balloon sets (balloons, camera mounts, tether, winch, and hand reel) • Cameras: DJI Osmo, Sentera NDVI	• GA salaries • Quadcopter Supplies (batteries, propellers) • Helium • Camera supplies (batteries, memory cards)	• Heavy-lift drones • RTK GPS unit • Spectrometer • Color-IR airborne imaging system

We also propose a new **Unmanned Aerial Systems (UAS) Training Lab** (Table 1). In recent years, UAS (commonly referred to as "drones") have emerged as a vital platform for collecting geospatial data – a trend that is certain to continue and accelerate. The establishment of a UAS Training Lab will necessitate acquisition of the following items: quadcopter units, tethered helium balloon systems, digital cameras, helium, and aerial image processing software. The UAS Training Lab would also need to employ two Graduate Assistants who would work under the supervision of the ASPIRE lab manager to maintain field equipment and to provide regular workshops to UNM students on the collection and analysis of UAS image data, GPS data, and other geospatial tools. Tethered helium balloon systems will serve as an alternative to autonomous UAS for students who do not have a Remote Pilot Certificate to fly quadcopters, enabling students and faculty across campus to collect and leverage high-resolution aerial

imagery with minimal training. UAS will be used for training through workshops and will be available for checkout by students and faculty who have attended those workshops and possess a remote pilot certificate from the Federal Aviation Administration (FAA). Funding for the establishment of the UAS Training Lab contains both one-time (e.g., hardware) and recurring (e.g., GA support) funding.

5. What are your unit's current non-SFRB sources of funding (e.g. Instructional & General, state or federal grants, self-generated revenue), and if applicable, what additional funding sources are you seeking this fiscal year?
a. What increases or decreases from non-SFRB funding sources do you anticipate compared to your budget last year?
b. Please complete Budget Form C for non-SFRB income.

As a new unit, ASPIRE is currently self funded and as such does not have an established operating budget. We are seeking SFRB funding to more firmly establish our footing as an organization and expand our staffing.

6. Describe student participation in your unit, and any plans to improve it, addressing each of the following bullet points.
a. How are students involved in the governance/decision-making of your unit?

Student researchers including graduate and undergraduate students form the core of ASPIRE's research efforts, conducting a variety of complex geospatial fieldwork and analysis services.. Many of these students develop education and outreach materials for the broader community, including remote sensing learning modules for use by tribal colleges and universities; K-12 outreach materials for a participatory science program to develop a machine learning method to count waterfowl in UAS imagery; geospatial data, knowledge, and environmental risk maps for tribal community health disparity reduction, geospatial maps for COVID-19 prevention and control, and a workshop for UNM students on completing FAA remote pilot certification.

Students are actively involved in the governance/decision-making of ASPIRE. The lab manager who is directly involved in ASPIRE's governance/decision making is also a current PhD candidate in the department of Geography and Environmental Studies. Furthermore, as a new center, ASPIRE has already involved students in planning and hosting the center's Spatial Data Brown Bag Workshop Series and undertaking significant planning for Geography Awareness Week and GIS Day events. In the future, students will also lead planning and hosting of several geospatial workshops that will benefit the at-large UNM community.

b. How many students do you employ (including graduate assistants, interns, etc.)?

The ASPIRE Center employs 9 graduate research assistants and 1 undergraduate project assistant as a new center, including the current lab manager. We will increase our commitment to student support in the future, including more undergraduate students, internship positions, and student staff positions. .

7. Describe specific improvements your unit has made in the last fiscal year to the visibility/accessibility of its services, and any plans to further improve visibility/accessibility.

Improvements made in the past fiscal year are part of an ongoing, multi-year effort to improve the visibility, accessibility, and overall quality of resources and services available to students. As a new center, in the last fiscal year, we have hired a lab manager which allowed us to vastly improve lab access and host students with extended, consistent hours. In addition, we have equipped 4 computers that are up to date and running for users at all times the lab is open, and log-in protocols have been updated so they are consistent across campus for ease of use. We have also launched ASPIRE website and enhanced web presence to ensure that students have an easily accessible site where they can find access information, general information of ASPIRE, and announcements for upcoming events in our center. As part of the Interdisciplinary Science Cooperative, a new administrative Unit within the College of Arts & Sciences, ASPIRE participates in Co-op events and benefits from the increased networking and organizing capacity of the Co-op In addition, we participated in GIS day in 2019 in the Student Union Building to further promote our center to the entire student body as well as make our student base aware of our resources.

ASPIRE's recent establishment combined with the ongoing pandemic has proved a challenge to promoting visibility and accessibility of our services. Our major current form of outreach is our **Spatial Data Brown Bag Series**, a virtual event inviting students working in geospatial research across disciplines to share and workshop their research with peers in a low-stress environment. We currently advertise through the IS Co-op newsletter as well as multiple departmental listservs.

When the public health order permits in-person gatherings, we plan to host an **open house** along with the other six IS Co-op centers. At this event, we will have current students speak about their research, offer tours of the lab, and equipment workshops and demonstrations. We plan part of this event to be aimed at students and part of this event to be aimed at community members, research collaborators, and funders. In addition, we have been actively reaching out to students who lack computer or geospatial software access so that they are aware of our resources that are free and safe to access during the pandemic.

ASPIRE is now primed for further expansion by adding access for the broader UNM student community, dependent on our ability to undertake infrastructure updates and to add software, hardware, equipment, and technical personnel, as detailed above. We will work with the UNM webmaster to ensure our facilities have a voice on the university site in congruence with our center site. We will continue to expand open lab hours as much as possible for UNM students to use our specialized software for projects. With student usage growing quickly, additional computers will increase accessibility for as many students as possible, while the addition of new UAS and imaging equipment to our checkout roster will improve the range of resources available to students.

8. How does your unit collaborate with other campus units and/or off-campus entities?

At the faculty level, we engage broadly across the UNM campus and throughout New Mexico. We currently have 6 affiliated faculty members, from Geography and Environmental Studies,

Civil Engineering, and Computer Science. These faculty members serve as research collaborators and student research advisors, working on interdisciplinary, "real-world" geospatial and environmental applications. We additionally collaborate with students and faculty in Biology, Anthropology, and Earth and Planetary Sciences.

Outside of UNM, our academic partners include the Southwestern Indian Polytechnic Institute, Dine' College, Navajo Nation Tribal College, Northern Arizona University, Montana State University Billings, Virginia Tech, and Carinthia University of Applied Sciences in Austria. We also collaborate with federal agencies including the US Fish and Wildlife Service, Environmental Protection Agency, Army Corps of Engineers, US and NM Department of Transportation, and the National Institute of Environmental Health Sciences.

We also have begun participatory (citizen) science initiatives with the Bosque Ecosystem Monitoring Program (BEMP), the Bosque School, and US Fish and Wildlife's Houston Community Partnerships and Engagement.

9. What methods have been used in evaluating your unit's impact on the student population (e.g. surveys, focus groups, interviews), and how effective have those methods been? Please provide any data collected if it pertains to the application.

As a new unit, we have not yet conducted this kind of evaluation. However, two surveys on students' interest in specific geospatial software, hardware, and UAS Training have been conducted among students across campus by the department of Geography and Environmental Studies in 2016 and 2017. The 2016 survey was deployed among 74 students and survey results provided a clear indication of students' interests (over 70% of students) in having access to geospatial equipment (e.g. GPS enabled cameras, GPS units, and GPS enabled tablets), particularly for UAS and UAS workshops. The 2017 survey was conducted among 273 students from 55 different majors. Among all surveyed students, top geospatial related upgrades (with over half of students who chose "yes") students would like to see include: UAS (71%), GPS enabled cameras (70%), GPS enabled tablets (65%), additional powerful workstations (59%), dual monitors (58%), and ultra-wide monitors (56%). Additionally, survey results also show that 68% of the surveyed students would attend free workshops focused on the use of UAS for imaging. A total of 56% of the surveyed students indicated that either they or their professors have a use for UAS imaging equipment or software in research.

Results from both surveys suggest that expansion and updates of geospatial capacity, other geospatial field equipment, and UAS training capacity is motivated by a desire to foster best geospatial practices across UNM. Therefore, this funding application is in direct response to the apparent and pressing need amongst the broader UNM community. If awarded, ASPIRE will have a direct benefit to the broader UNM community.

As a new center, we will conduct a survey in the future to continue evaluating the geospatial needs across UNM campus. We will have survey questionnaires posted online to collect more data from across the UNM campus. We'll also develop and conduct a survey to evaluate ASPIRE's impact on the student population at UNM in the future.

10. If your unit received specific recommendations from last year's SFRB, what are your unit's current plans to address these recommendations?

Last year our unit did not seek SFRB funding.

11. Provide any other information or a narrative that will assist the SFRB in making its decision to fund your unit.

ASPIRE is an **interdisciplinary** unit that trains students to find the tools – both physical and analytical – required to answer complex questions of societal importance. As described above in Question #8, our students, faculty, and staff collaborate closely with students and faculty from across campus on research, education, and program development. We are able to do this so readily because geospatial tools and thinking are required by and directly benefit virtually all disciplines and departments. We are extremely well positioned to make available the training and tools required for UNM students to compete in a world that increasingly relies on geospatial tools and information for decision making, research, and business development.

The expansion of our lab facilities through additional staffing and core geospatial field and computing equipment and software is intended to establish ASPIRE as a facility that will **enable the broader UNM community to enhance geospatial literacy and capacity** amongst students and faculty. ASPIRE faculty and students are routinely approached by others from across campus (and beyond) with requests to help guide geospatial data acquisition strategies, equipment acquisitions, and training/capacity building. This funding application is, therefore, in direct response to the apparent and pressing need amongst the broader UNM community. The additional staffing and equipment capacity to conduct the UAS workshops will further increase our ability to support the training of UNM students for the GIS job market. Jobs related to Geographic Information Scientists or Technologists continue to grow (by 29% by 2024 according to the U.S. Bureau of Labor Statistics). Based on the Economic Impact of Unmanned Aircraft Systems Integration in the United States report, more than 103,000 jobs in UAS will be created through 2025 in the United States. In the state of New Mexico, it is projected that at least 3,000 jobs will be created in UAS. Therefore, this additional funding for UAS related equipment, software, and training workshops will better prepare graduates to become successful and advance their careers with geospatial skills necessary in the workplace.

Use this form ONLY if you are requesting ONE-TIME funding

DEPARTMENT The Center for the Advancement of Spatial Informatics Research and Education (ASPIRE)
VICE PRESIDENT James Paul Holloway
INDEX # 286038

STUDENT FEE REVIEW BOARD
FISCAL YEAR 2021-2022

Budget for SFRB Funding ONE-TIME Request

	DESCRIPTION	I 2020-2021 One-Time Request	2020-2021 One-Time Allocation	J 2021-2022 One-Time Request
1	4x Dell Precision 3431 Small Form Factor	$0.00	0	$5,400.00
2	16x Dell 27 Monitor - P2719H	$0.00	0	$3,200.00
3	Agisoft Metashape Pro Lab License	$0.00	0	$5,770.00
4	6x Apple 9.7" iPad Pro 128GB	$0.00	0	$4,375.00
5	6x Samsung TabPro S12" 128G	$0.00	0	$4,500.00
6	8x Mavic Pro 2 w/battery expansion pack	$0.00	0	$16,000.00
7	6x Skyshot (2 cubic meters capacity) Helil	$0.00	0	$9,575.00
8	2x Desert Star (5 cubic meters capacity) H	$0.00	0	$14,103.00
9	2x Sentera DJI Mavic NDVI	$0.00	0	$4,000.00
10	8x DJI Osmo Pocket	$0.00	0	$3,000.00
11	16x SanDisk 128GB Extreme microSDXC UHS-I Memo	$0.00	0	$400.00
12	5x EMLID Reach RS+ GNSS survey kits	$0.00	0	$4,000.00
13	EMLID Reach RS2 GNSS survey kit	$0.00	0	$1,900.00
14	EMLID Reach M+ for UAV mapping	$0.00	0	$265.00
	ZED 2 Stereo Camera	$0.00	0	$450.00
16	6x Range pole, tripod for GNSS kit	$0.00	0	$2,500
17	**TOTAL One-Time funding (Line 1 thru Line 6)**	**$0**		**$79,438**

*The narrative response to question **#4** must reflect this information

SFRB Funding Application Executive Summary for ASPIRE

The newly established Center for the Advancement of Spatial Informatics Research and Education (ASPIRE) brings together faculty with expertise and cutting-edge research portfolios in a broad range of Geographic Information Systems (GIS) science subfields, including spatial modeling, geo-visualization, geo-AI, remote sensing, and spatial statistics. All ASPIRE researchers have established records of collaboration across disciplines, modes of inquiry, and application domains. ASPIRE promotes collaboration between these faculty and the larger research enterprise at UNM, allowing efficient acquisition and maintenance of shared resources, while also serving as a resource to UNM and the greater New Mexico community for expertise in GIScience and Geographic Information Technologies (GITs).

ASPIRE fills a growing need in the UNM community, as GITs are now being used throughout the research enterprise at UNM, especially by the physical sciences (e.g. Biology, Earth and Planetary Sciences) and Engineering (e.g. Civil Engineering, Mechanical Engineering), but also by social sciences (e.g. Anthropology, Architecture and Planning, Libraries) and professional programs (e.g. Marketing, Public Administration). These fields all rely on GITs to collect, store, and analyze data relevant to their scientific questions. Their students, along with those in Geography and Environmental Studies (GES), need access to cutting edge tools and training at UNM in order to be successful when they enter the job market. GIScience related fields in remote sensing, photogrammetry, and global navigation satellite systems (GNSS) represent the second fastest growing job sector in the United States, with 29% growth expected by 2024, according to the U.S. Bureau of Labor Statistics.

We seek SFRB funding to expand our ability to offer UAS and spatial data processing, training, and support services to students across campus, including a series on Unmanned Aerial Systems (UAS) hardware and training and preparation for FAA remote pilot license under Part 107. This will involve recurring funding for two graduate assistants (GA), as well one-time funding for a suite equipment to support UAS imaging collection, including quadcopters, helium balloons, imaging cameras, and GNSS survey equipment that will be available for checkout by student researchers. ASPIRE anticipates being able to support equipment replacement going forward.

We are a newly established Center, having just opened our lab in December 2019 with the completion of the Physics, Astronomy, and Interdisciplinary Sciences (PAIS) building. ASPIRE has no ING operating budget, only returned F&A and service center fees, which by requirement can only be used to fund the services themselves. We seek SFRB funding to directly support our mission to enhance geospatial literacy and capacity within the UNM education and research community. Our faculty and students are already routinely approached by researchers across campus (and beyond) with requests to help guide geospatial data acquisition strategies, equipment acquisitions, and training/capacity building. <u>This funding application is, therefore, in direct response to this apparent and pressing need amongst the broader UNM community</u>. Expansion of ASPIRE, its equipment offerings, and training capacity is motivated by a desire to foster best geospatial practices across UNM and out of a desire to efficiently use UNM's resources to make available core geospatial equipment and training that is increasingly required by students and researchers across our community.

SFRB Funding Request Form

STUDENT FEE REVIEW BOARD
FISCAL YEAR 2021-2022

DEPARTMENT The Center for the Advancement of Spatial Informatics Research and Education (ASPIRE)
VICE PRESIDENT James Paul Holloway
INDEX # 286038

		A	B	C	D	E	F
	DESCRIPTION	ORGANIZATION OPERATING BUDGET 2019 -2020	TOTAL BUDGET 2020 - 2021 (not including SFRB)	SFRB BUDGET 2020 - 2021	TOTAL BUDGET 2021 - 2022 (not including SFRB)	SFRB BUDGET REQUESTED 2021- 2022	SFRB FUNDING INCREASE/DECREASE REQUEST 2021 - 2022
							-
1	Faculty salaries						
2	Staff salaries	-				60,000	60,000
3	SUBTOTAL NON-STUDENT SALARIES (Line 1+2)	$ -	$ -	$ -	$ -	$ 60,000.00	$ 60,000.00
4	Student (student employment & workstudy)	-					
5	GA, TA, RA - Pay and Benefits	-	-			52,238	52,238
6	Fringe Benefits on Staff & Faculty salaries					21,000	21,000
7	TOTAL COMPENSATION (Lines 3 - 6)	$ -	$ -	$ -	$ -	$ 133,238.00	$ 133,238.00
							-
	GENERAL EXPENSES						
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32	TOTAL GENERAL EXPENSES (Line 8 - 30)	$ -	$ -	$ -	$ -	$ -	$ -

							-
34	**GRAND TOTAL EXPENSES** (Line 7+32)	$ -	$ -	$ -	$ -	$ 133,238.00	$ 133,238.00

Form C

External Funding Sources

This form is used ONLY if you have EXTERNAL FUNDING SOURCES

DEPARTMENT Interdisciplinary Science Cooperative - ASPIRE
VICE PRESIDENT
INDEX(es) # 286034, 860222

STUDENT FEE REVIEW BOARD
FISCAL YEAR 2021-2022

	FUNDING SOURCE	2020-2021 BUDGET	2021-2022 FORECASTED BUDGET	Funding Increase Request for 2021-2022
1	Student Fee Review Board (SFRB)			
2	UNM Instruction & General	21,816	32,724	10,908
3	Private Donations			-
4	Fundraising/Foundation/Development			-
5	State Funding			-
6	Federal Funding			-
7	Grants (including federal and private)	**11,085**	-	(11,085)
8	Self-Generated Revenue	-		
9				-
10	**If Other(s), please list below:**			-
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	TOTAL OPERATING INCOME/REVENUE	**$ 32,901.41**	**$ 32,724.00**	**$ (177.41)**

*The narrative response to question #5 must reflect this information